



Comparison of Kinanthropometry Profile of Different Track and Field Athletes

Praveen Vasanthan Murugan ¹, Muthukumaran Jothilingam ^{1,*}, J.P. Andrew Anbarason ¹

¹ Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical Science, Chennai, Tamil Nadu, India

* Corresponding authors email: muthukumaranjothilingam3@gmail.com

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Resumen

Introducción: Es bien sabido que la Antropometría de los rasgos físicos es crucial para el crecimiento de un atleta para lograr un alto rendimiento en un deporte en particular. El conocimiento de la antropometría de Kin nos brinda las habilidades para medir diferentes partes del cuerpo, incluido el peso, la altura; diámetros, circunferencias y pliegues de la piel, y los atletas se seleccionan en función de estas medidas. Los estudios sobre las cualidades físicas del cuerpo humano muestran que los atletas exitosos tienen características morfológicas diferentes de la población general en términos de rasgos somáticos. **Métodos:** En este estudio se incluyeron un total de 100 atletas de pista y campo. Entre ellos, 65 eran atletas masculinos y 35 femeninos con una edad media de 22,35 (\pm 3,23) años. Se incluyeron en el estudio 33 corredores de corta distancia, 33 corredores de media distancia y 34 corredores de larga distancia. Medidas de longitud de los participantes como (i) Longitud de la pierna (ii) Longitud de la parte superior de la pierna (iii) Longitud de la parte inferior de la pierna Se midieron el diámetro del tobillo, el pliegue cutáneo (i) el pliegue cutáneo de la pantorrilla (ii) el pliegue cutáneo del muslo (iii) el abdomen. **Resultados:** Se midió y tabuló la desviación media y varada de la altura, el peso, la medida de la longitud, las circunferencias corporales, los diámetros esqueléticos y los pliegues de la piel. La composición corporal de los corredores de corta, media y larga distancia fue mesomorfa-endomorfa, mesomorfa-mesomorfa y ectomorfa-mesomorfa respectivamente. **Conclusión:** El estudio concluyó que las características antropométricas fueron uno de los factores más influyentes en la determinación de un buen rendimiento físico deportivo. Cada deporte posee un tipo de cuerpo diferente y los datos antropométricos juegan un papel vital en la selección de atletas.

Palabras Clave: Corredores, Composición corporal, Longitud de extremidades, Circunferencia, Grosor de pliegues cutáneos.

Abstract

Introduction: It is well recognized that the Anthropometry of physical traits is crucial for an athlete's growth to achieve high performance in a particular sport. Knowledge of Kin anthropometry gives us the skills to measure different body parts, including weight, height; diameters, circumferences, and skin folds, and athletes are selected based on these measurements. Studies on the human body's physical qualities show that successful athletes have different morphological characteristics from the general population in terms of somatic traits. **Methods:** A total of 100 Track and Field athletes were included in this study. Among them 65 were male and 35 were female athletes with a mean age of 22.35 (\pm 3.23) yrs. 33 Short-distance runners, 33 Middle Distance runners, and 34 long-distance runners were included in the study. Participants' length measurements like (i) Leg length (ii) Upper leg length (iii) Lower leg length Body Girths (i) Calf girth (ii) Thigh Girths (iii) Hip Girths, Skeletal Diameters (i) Knee Diameters (ii) Ankle Diameter, Skin fold (i) Calf skin fold (ii) Thigh skin fold (iii) Abdomen were measured. **Results:** Mean and stranded deviation of height, weight, length measurement, body girths, skeletal diameters, and skin folds were measured and tabulated. The body composition of short, middle, and long-distance runners was Mesomorph – Endomorphic, Mesomorph – Mesomorphic, and Ectomorph – Mesomorphic respectively. **Conclusion:** The study concluded that anthropometrical characteristics were one of the most influential factors in determining good athletic Physical performances. Each sport possesses a different body type and anthropometric data plays a vital role in the selection of athletes.

Keywords: Running athletes, Body composition, limb length, Circumference, Skinfold thickness.

Introduction

Despite having a large population, India has not had much of an impact on the world of international sports. Indian athletes' and boxers' subpar performance at the world level has been a source of significant concern, particularly for coaches, sports scientists, and sports administrators. (Sidhu, J. S et al 2009) The interplay between a person's genotype (genes) and environment—the external factors to which they are exposed, such as sports training, diet, climate, way of life, and habits—leads to the development of the human body. Kinanthropometry is the study of the human body in terms of its dimensions, proportions, composition (in terms of Fat and Fat Free Mass), and functionality in order to comprehend growth, performance, and nutritional status, particularly in connection to sport participation. (Mathur, 1985).

It is well recognized that the anthropometry of physical attributes is crucial for an individual's growth to acquire a high degree of performance in a particular sport. (Khan, 2016). Knowledge of kinanthropometry gives one the skills to measure different body parts, including weight, height, diameters, circumferences, and skin folds. (Masanovic, 2019). Sportspeople are chosen based on Studies on the human body's physical qualities to date show that successful athletes have different morphological characteristics from the general population in terms of somatic traits. Physical traits are particular to each person. Kinanthropometry investigates the relationship between the structure and function of physical attributes for a specific sport (MacDougall et al., 1992).

Track and field Athletics is a well-liked and exciting activity that includes both individual and team competitions. It is a fiercely competitive sport that puts participants' physical prowess, grit, and endurance to the test. Track and Field athletes compete in a range of activities like running, leaping, and throwing. (Mumtaz, 2012) They are renowned for their extraordinary speed, agility, strength, and endurance. The sport has a lengthy and rich history that dates back to the Greek Olympic Games, and it has developed into a highly technical and specialized sport over time (Garay et al., 1974). In today's top international tournaments like the Olympics, World Championships, and Commonwealth Games, Track and Field athletes from all over the world compete at the highest level, thrilling and inspiring viewers with their outstanding performances.

This essay will go into the world of track and field sports, covering its history, events, preparation, and difficulties that competitors must overcome. The goal of the present study was to determine the anthropometric profile of athletes who competed in short, medium, and long-distance running.

Material and Methods

Participants

A total of 100 young athletes were selected from the Sports Development Authority of Tamilnadu (SDAT), Chennai. Among them 65 were male and 33 were female athletes with a mean age of 22.35 (\pm 3.23) yrs. 33 short-distance runners, 33 middle-distance runners, and 34 long-distance runners were included in the study. Both gender of athletes, who were continuously in sports for more than 2 years, were included, and aged between 18 and 25 years. Athletes who were injured recently and athletes who were in a recovery state were excluded. All participants had a similar diet (Mediterranean diet without supplements). Inform concerns were obtained from all participants.

Equipment

- i. Anthropometric rod with a 0.5 cm resolution was used to assess the height.
- ii. Portable Weighing scale was used to calculate body weight to the nearest to 0.2 kg.
- iii. Girth was measured with an anthropometric tape.
- iv. Sliding caliper was used to assess bone diameters.
- v. Skinfold caliper was used to measure skin folds thicknesses.

Anthropometric measurements

Anthropometric measurements were measured according to standard methods standardized by The International Society for the Advancement of Kinanthropometry (ISAK).

Results

The anthropomorphic data of all the athletes were measured and tabulated. Mean and standard deviation of height, weight, length, girths, bone diameters, and skin fold thicknesses were presented in the following Tables (Table 1-5). There were statically significant differences in certain parameters, where some parameters were not significantly different like height and weight.

Table 1. Mean and Standard Deviation of height, and weight of all athletes

Variables	Short distance Runners (100m,200m)		Middle distance Runner (800-1500m)		Long distance Runners (≤5000m)	
	Mean	SD	Mean	SD	Mean	SD
Height (cm)	165.2	2.4	164.2	3.1	162.2	1.7
Weight (kg)	63.5	3.8	68.4	4.2	52.3	2.5

*P ≤ 0.05

Table 2. Leg lengths of Short-distance, Middle-distance, and Long-distance Runners.

Variables	Short distance Runners (100m,200m)		Middle-distance Runners (800m-1500)		Long distance Runners (≤ 5000m)	
	Mean	SD	Mean	SD	Mean	SD
Upper Leg length (cm)	40.2	3.2	39.4	3.4	41.2	2.3
Lower Leg length (cm)	39.8	3.4	38.2	3.1	40.3	3.2

*P ≤ 0.05

Table 3. Thigh and Calf Girths of Short-distance, Middle-distance, and long-distance Runners.

Variables	Short distance Runners (100m,200m)		Middle distance Runners (800m-1500m)		Long distance Runners (≤5000 m)	
	Mean	SD	Mean	SD	Mean	SD
Thigh Girth (cm)	40.3	3.2	43.4	5.08	46.8	6.19
Calf Girth (cm)	28.5	3.8	30.3	2.36	32.0	2.62

*P ≤ 0.05

Table 4. Skeletal diameter of Short distance, Middle distance and Long distance Runners

Variables	Short distance Runners (100m,200m)		Middle distance Runner (800m-1500m)		Long distance Runner (≤5000 m)	
	Mean	SD	Mean	SD	Mean	SD
Knee diameter (cm)	11.8	0.42	12.4	0.28	14.8	0.49
Ankle diameter (cm)	8.5	0.38	9.3	0.36	9.8	0.62

P < 0.05

Table 5. Skinfold thickness Short distance, Middle distance, and Long distance runners

Variables	Short-distance Runner (100m,200m)		Middle distance Runner (800m-1500m)		Long distance Runners (5000 m)	
	Mean	SD	Mean	SD	Mean	SD
Thigh Skin fold (mm)	7.23	1.34	7.04	2.35	5.70	1.43
Calf Skin fold (mm)	7.12	2.03	6.82	2.09	2.94	2.46
Abdomen Skin fold	9.12	1.89	8.21	2.94	3.75	0.58

*P ≤0.05

Discussion

Anthropometric characteristics, physical fitness, and athletic performance are associated with each other very strongly. The capacity to perform well in a particular sport or athletic activity may depend on the size and shape of the body as well as one's level of physical fitness. But it is crucial to keep in mind that athletic success is also influenced by other factors like ability and mental fitness. According to the findings of the present study, the weight and skinfold measurements of short, middle, and long distance runners varied depending on their level of performance. By providing some inherent advantages, the anthropometric profile can significantly contribute to success in particular sports (Bach et al., 2015). A sportsperson's physical attributes have a significant impact on their degree of performance. However, there can also be significant disadvantages posed by size and resultant mass that could prove to be a hindrance to success. But in Track and Field, most athletics require a good height for better performance (Uth, 2005).

The short distance performance depends on the muscle-stored glucose, and ATP-CP energy release system to exhibit vigorous energy in short duration to win the race. Thus, the lower body compositions are much larger than their upper body. They need a big muscular body for aerodynamic advantage and to withstand torque production. Middle distance runners possess significantly higher body weight, and skinfold thicknesses. Greater fat content in the body affects performance negatively (Radulovic, 2012). In the present study no significant differences were found in Height, Girths, and Bone diameters. Body shape, muscle strength, relative lengths of legs, heels, and toes as well as the fine-tuned nervous system to pull the whole thing together are just some of the biological attributes that makes world-class Track and field Athlete. Long distance runners have lean and less body fat. They tend to have long lower limbs and more type 1 muscle group for their endurance based activities. They have a large and wider thorax for the consumption of more air to meet the great oxygen demand created by the body.

Somatotyping can be important in sports because different body types may be better suited to certain sports or positions within a sport. For example, mesomorphs, who tend to have a muscular build, may be well-suited to sports that require power and explosiveness, such as weightlifting or sprinting. Ectomorphs, who tend to be thin and have a low body fat percentage, may be better suited to sports that require endurance, such as long-distance running (Mumtaz, 2012).

Other factors besides body type, such as skill, technique, and mental toughness, play important roles in athletic performance (Navas et al., 2023). In the present study, there were significant differences between middle-distance & long-distance runners. Long-distance runners showed better anthropometric measurements.

The present study concluded that anthropometrical characteristics were one of the most influential factors in determining good athletic physical performances. Further research on anthropometric data of different sports needs to be explored, which plays a vital role in understanding the attributes and advantages of Indians in the sports arena.

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Conflicts of Interest

The Authors have no Conflicts of Interest to declare that they are relevant to the content of this Article.

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